

# The National Geographic Magazine

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# THE National Geographic Magazine

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No. 6

## THE SEINE, THE MEUSE, AND THE MOSELLE

By WILLIAM M. DAVIS

*Professor of Physical Geography in Harvard University*

*The three rivers.*—The narrow basin of the Meuse lies between the widespreading branches of the Seine on the west and of the Moselle on the east. The slender trunk stream of the Meuse,

with hardly a tributary on either side, is like one of those tall, close-trimmed poplars that the traveler often sees along the national roads of France, and the comparison is not altogether inapt, for there is good reason to think that the Meuse has really been

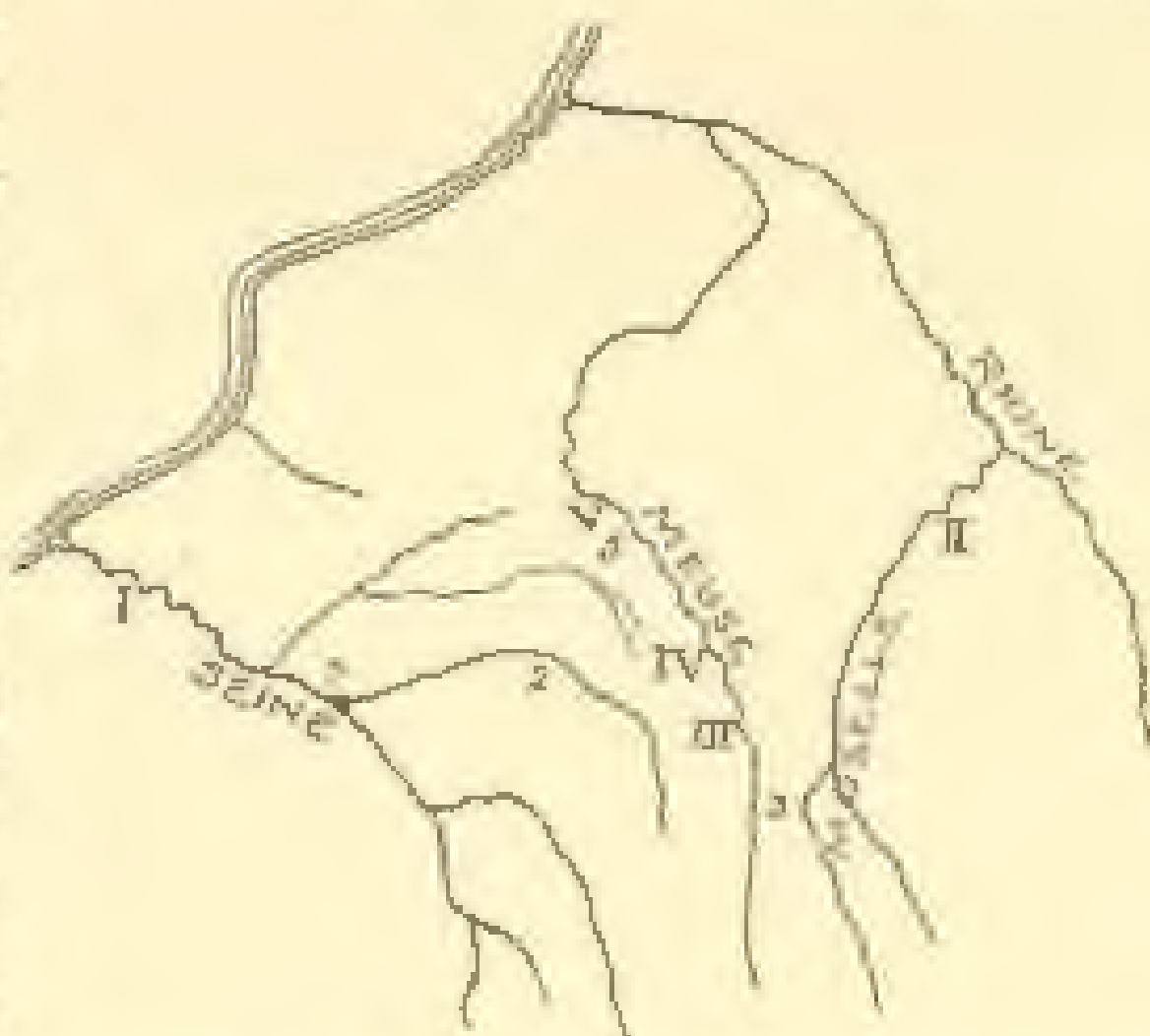


FIGURE 1.—The Arabic numerals on this figure show the different locations of the other figures used in this article. The Roman numerals show the location of the page plates.

trimmed of certain branches which have been diverted to the basins of its larger neighbors. Its basin is, indeed, like the

detaching territory of a petty prince between the encroaching kingdoms of powerful rulers on either side. The evidence of this will appear when we examine the characteristics of the three rivers.

*The vigorous meanders of the Seine.*—The Seine, after gathering in its upper branches both above and below Paris, pursues a strongly meandering course to the sea. Its lower valley is sunk with rather steep sides in a comparatively even upland, which itself is a surface of denudation. Although without complete proof on this point, I am led to suppose that this gently rolling upland is an uplifted peneplain—that is, a denuded region that was once reduced to a surface of moderate relief close to its controlling baselevel, and then raised by some gentle process of elevation to its present altitude. During the development of the peneplain the Seine, the master river of the region, must have attained an extremely faint grade, and at the same time have taken on the habit of swinging from side to side in comparatively regular curves or meanders such as are characteristic of rivers with gentle slope. With the uplift of the region the meandering river would proceed to incise its channel beneath the uplifted surface, and thus Ramsay accounted for its peculiar intrenched meanders many years ago. They seem to be features of old age retained in youth of the present cycle of denudation as an inheritance from an advanced stage of a preceding cycle.

In the second cycle of denudation, now in progress, the belt of country inclosed by lines tangent to the outer meander curves of the Seine seems to have broadened to greater width than it possessed before the uplift of the region occurred. The evidence of this is seen in the long sloping descent of each tongue of land which enters one of the river curves and from which the river seems to have receded, while the outer side of the swinging current undercuts a bluff of steep descent from the upland, as if the river were pressing against it. If the meandering river had cut down its channel vertically the slopes on the two sides of its present course should be symmetrical.\* The reason for the increased breadth of the meander belt appears to be in the increased velocity given to the river in consequence of the uplift of the region. Many similar cases might be mentioned, but none show more clearly than the Seine the special features of an invigorated river. The great curves around which it swings fit in nearly all cases close to the bluff on their outer side. It is an able-bodied river, a river of a robust habit of life.

\* See note by A. Winflow in *Science*, 1903.



VALLEY OF THE SEINE, NEAR NOGENT

Sheet 11, Map of France, 1:100,000







*The case of the Ste. Austreberte.*—Not far below the city of Rouen and precisely at the small town of Duclair, on the north bank of the Seine, there is an interesting little occurrence strongly confirmatory of the invigorated habit of the swinging river. Duclair is situated on the outer side of a large north-turning meander. Into this north-turning meander descends a long sloping spur from the upland south of the river; east and west of Duclair similar long sloping spurs descend from the northern upland into the adjacent south-turning meanders. On looking closely at the map of the country or, still better, on looking over the region itself from the top of the bluff at the back of the town, it is seen that the western of the two northern spurs is obliquely cut across by a narrow, dry, flat-bottomed valley, which is just in continuation of the course of a little stream known as the Ste. Austreberte, coming from the northeast and emptying in the Seine at Duclair. The dry valley was evidently at one time followed by the lower course of this stream, and it is still followed by the highway and the railway, for which it serves for a "short-cut" on their way down the Seine. (See Plate XXI.)

The question then arises, Why has the stream deserted so well prepared a path? The answer is not far to seek. The change evidently occurred because the Duclair meander of the Seine pushed its inclosing bluff further and further north until the river cut through the ridge that separated it from the Ste. Austreberte and thus tempted that stream to desert its lower course. This little fact, taken in connection with the slopes of the dovetailing spurs, fully justifies the opinion that the Seine is a most vigorous river, not only competent to swing around the curves of its former meanders, but demanding an increased radius for every curve, and thus widening its meander belt. Here and there, it is true, the swinging course of the river departs somewhat irregularly from the round curves of its valley, as if the river had strunk somewhat away from the strong curves which it once followed. This may perhaps be explained as the result of the diminishing velocity of the river, now that it has cut its new valley deep below the adjacent upland and close to the controlling baselevel, but the irregularities are exceptional and they need not be further considered. As a whole, the river may be regarded as an able-bodied stream turning vigorously from curve to curve on its way to the sea.\*

\*An incident of the Ste. Austreberte type is found in the valley of the Marne a short distance below Meaux, where the Grand-Morin now joins the Marne at Tournay-Villevey, abandoning a former lower course which led it to Pissy.

*The robust habit of the Moselle.*—Let us next glance at the lower course of the Moselle. Passing below its upper branching course and following it below Trèves through the highlands to the Rhine, we find here again a most serpentine valley incised beneath the general upland of the region. Ascending from the valley bottom, which the traveler ordinarily follows, to the level of the inclosing upland, it is even more manifest here than in northwestern France that we have to do with an uplifted and well-dissected peneplain. The surrounding region is one in which the rocks are greatly deformed, possessing all the characteristics of mountain structure, but few of the characteristics of mountain height. Indeed, the upland between Trèves and the Rhine is one of the best examples of an uplifted peneplain that I have seen. The gently rolling surface shows little regard for the great diversity in the attitude of its rocks. Here and there it is still surmounted by low, linear eminences, such as the Idarwald and the Soonwald, following the strike of resistant quartzites. These I would call "monadnocks," taking the name from a typical residual mountain which surmounts the uplifted peneplain of New England in southwestern New Hampshire.

But how has the Moselle come to follow a meandering valley deeply incised in the peneplain? It is manifest, from what is now known concerning the geological development of land surfaces, that during the later stages of the denudation of the middle Rhine highlands the stratus of the region must have flowed idly along meandering courses with gentle slope in channels little below the surrounding surface; but at present the streams, and especially the master rivers of the region, have deeply incised courses inclosed by steep-sided valleys. Clearly, then, the region has been uplifted since the denudation of the peneplain and is now well entered in a second cycle of denudation. The meanders developed in the later stages of the previous cycle of denudation are inherited in the early stage of the present cycle.

It is worth noting, however, that there seems to have been a pause during the general elevation of the region, for the valley of the Moselle may be described as a narrow, meandering trench cut in a wide-open, flat-bottomed trough, the trough being sunk well beneath the general surface of the adjacent upland. The same sequence of forms may be clearly recognized in the valley of the Rhine, particularly in the neighborhood of Bacharach, where the old river alluvium still lies on the floor of the uplifted trough, although the existing river trench is sunk several hun-





about 500 ft. with 100 ft. It is just therefore to be expected that the

of the region to its present height was accomplished in two movements and that a longer interval of comparative rest followed the first movement than has yet elapsed since the second. But it must also be well stated that the time that has elapsed since the first of these movements to the present day is very short compared to the long cycle of denudation during which the present mountains of the region were worn down to the general surface of the peneplain.

The meanders which the Moselle now follows in its serpentine character are therefore to be regarded as the inheritance of a me-

here, as in the case of the Seine, the present width of the meander

ing from the difference in the slopes of the interior spurs and the steep bluffs opposite them on the outer side of the river curves. The Moselle, like the Seine, swings around its curves with a constant, well defined turn on, nowhere hesitating to take the round with straight passages and no visible break.

*The two entrenchments near Kermastel*.—At several points the spurs from the upland have very narrow necks through which the valley roadway passes in "short-cut" tunnels. Although I have not found any example of the diversion of a side stream by the lateral growth of the river near here, yet such a change is imminent just a mile further on, where the ridge between the Moselle and the Ardèche is reduced to a very narrow measure. But it does appear that, just above Kermastel the Moselle has played upon itself the same trick that the Seine has played upon the Ste. Austreberte. The Moselle at this point has an exceptionally straight course, but to the right and left of it rise two isolated hills, inclosed by troughs of horseshoe shape whose outer slopes rise to the general uplands. From the study of the maps at

former meanders of the river, now abandoned in favor of the more direct intermediate course, and an inspection of the district on the ground has confirmed this belief. I presume the fact is well known to students of river changes abroad.\* (See Plate XIII.)

Nothing can be more satisfactory than the agreement shown between the features of these abandoned meanders and of the

\* *Journal of Geology*, 1884, 10.

meanders at  $\frac{1}{2}$  mile, filled by the river further down the reach. The cut as if it were so is essentially the same in the several cases. The angles on the outside of the tongue are the same not matter, but I had seen them before. The isolated hills are the result of interlocking spurs, now discovered from the top. In the lower part of the river; the edges of these hills are

the result of the spurs that are now here, and, rejecting to the north, towards the east only so, the eastern range of the northern range is just opposite to the western range of the northern range. There can be no doubt, but the river of the Moselle has here so entirely swung against its outer bank that it has not only shortened its own course by cutting through the narrow necks of the intervening spurs. Perhaps I am putting too much emphasis on the last observation. It is not a great pity, for the partly abandoned river channels are not infrequently so

where it is reached by the Neckar at Landenau, just above, and in the plateau of western Pomerania, formed by the Elbe and its branches. It is not, however, the more important of

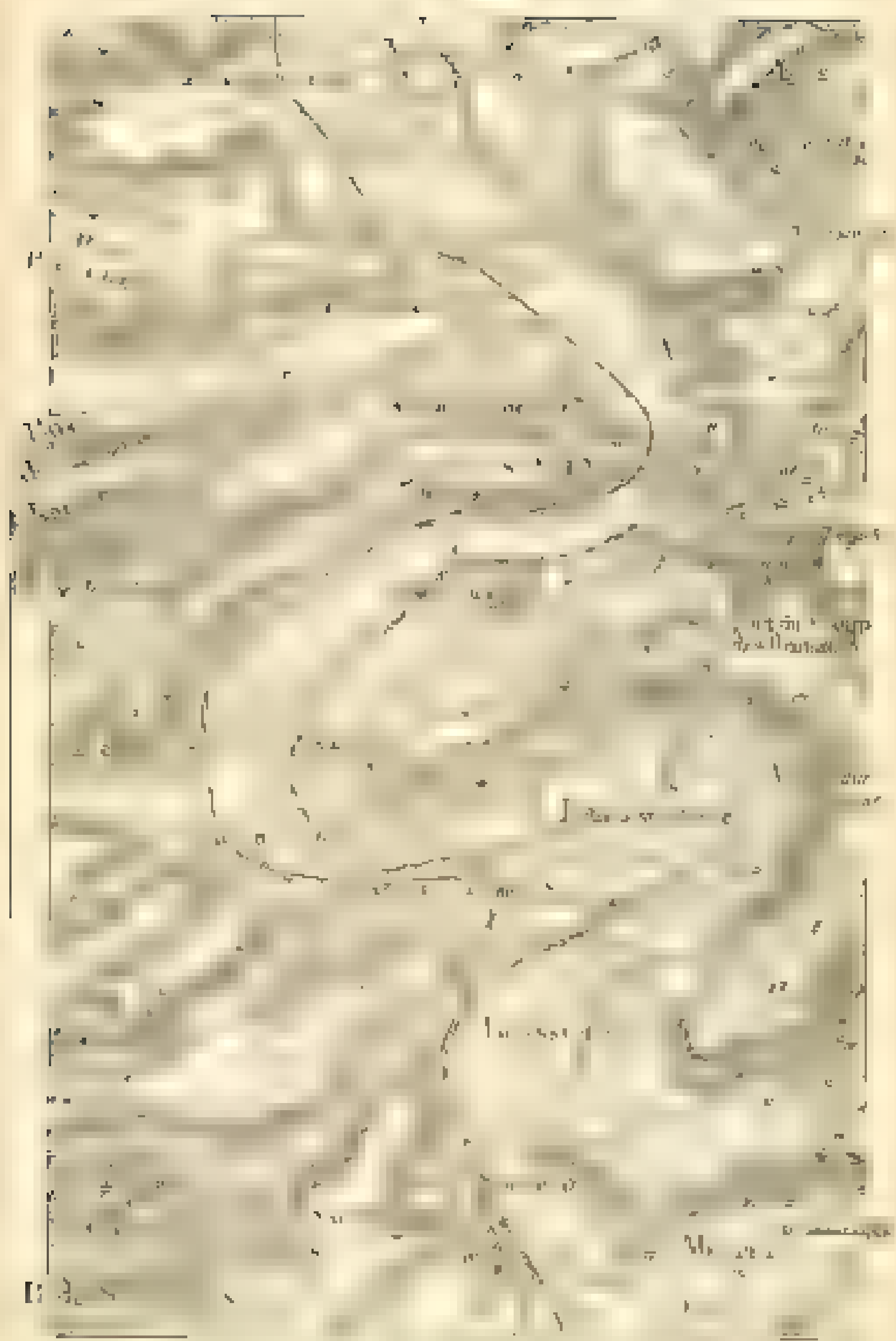
deserves emphasis. They all indicate strong river action. The river, like the Seine.

*The stopping place.*—Let us now look at the Moselle. From some distance above Constance, down stream as far as Verden and beyond, this river, like the others, follows a well defined meandering valley, and has beneath it a low and rather wide. As before the side of the hills on the outer side of the valley curves is comparatively steep, while the side of the opposite side of the valley is relatively gentle. Just above Constance, near Saxy, it Meuse, one of the spurs is almost cut through and is now connected with its upper by a very narrow and low neck, which alone separates the flood-plain of the curving valley on either side. The railway and canal both save obstacles by cutting across the low neck. At Dinschlag the neck of a lower spur is not so high. It may still be an isolated hill, but on all sides by the low valley floor.

\* The Kitzbühner map, 1:50,000, suggests three other subdivisions, the first of which is the first of the three, the second of the three, and the third of the three. The first of these subdivisions is











1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

It is reasonable, then, that this valley was excavated by a river and the Moselle but the *gorgona* river that was once here is now nowhere to be found. The floor of the valley is at present occupied for the most part by boulders, gravel, and sand, or by a free-sweeping current of water, and it is only a few miles from the Meuse, wandering here and there on the long level and staggering with most irregular steps across the valley floor. It wiggles from place to place, now touching this side of the valley, now that, swinging and flittingly against the steep cliffs and gentle slopes of the spurs, and at times even running for a short distance up the valley to its trough of path. Is it not then clear that since the time when the wide long valley was made there has been a great amount of change of water level and flow? No other explanation seems admissible, and hence a reason for the loss of water must be sought. (See Plates XXIII and XXIV.)

The loss of water cannot be ascribed to any external change, for this would have affected the Seine and Moselle as well as the

Meuse itself. If this were so, the Meuse would have been a

into the present tangled flat of staggering, after the fashion of other small streams, but at the same time the Seine and the Moselle would have been affected in their riparian belt of swinging freely around the curves of their valleys. Is it pos-

derived from the trunk river, and that the terminal drainage

*The migration of river courses.*—The question was raised here to a general discussion of the general problem of the shifting and migration of river courses, a subject that is of practical or interest to the student of physical geography. At first sight one would be inclined to think that the crest-line of a divide between a trunk river basin and a tributary merely waste water and lower as it weathered

any change in the area of the adjacent drainage basins. It is probable, however, that this simple process is of very rare occurrence in nature. It is much more likely that the line of the



for illustration of the structural features of river in erosion and in region.

A remarkable case of river diversion occurs in the shift of the course of the Neuse, from its former path down the valley now occupied by the Neize to a more northward course, by which it

runs of Proterozoic. This is well illustrated on the Prussian topographical maps, and has been described in a general way by

It was caused by the spontaneous interruption of streams converging for drainage area of 204, 1 shown that this disturbance is any, but about hope to find a full explanation of the

first the headwaters of the Wytheville, and in a recent volume

general treatment of the same region. Readers who wish to follow the subject into examples of greater intricacy may find some golden rule examples—the rivers of Pennsylvania and northern New Jersey.\*

In the general discussion of this problem we should recognize two divisions. First, the processes by which it is accounted for,

gradual forces by which its occurrence may be recognized, as

of the recent past and others likely to occur in the near or distant future. Illustration of the second division of the subject can best be given by describing the concrete case of the river Maine near Calais, than which no better example has come to my notice anywhere in the world.

*The case of the Maine before Calais.*—In the province of Calais, France the Maine drains an extensive marshy low and enclosed by a forested mountain on the west. The lowland is the product of comparatively rapid erosion during the Tertiary time on weak or porous strata. It is for the most part covered by extensive forest. The upland strata where the lower Tertiary strata have, during the same period of time more speedily eroded erosion. At the top of the strata is partly westward, and eastern margin of the upland is marked by a steep escarpment, the

on its way to the sea by a narrow valley cut through the escarpment.

In this valley it receives two branches on the east—first, the White, a special article of which has been given. The first is the Saco River, whose head is found on the upland near its eastern pre-cambrian margin; but, rapidly enough, although this stream of course runs almost toward its source near Montmorel, the valley into which it flows is narrower and is not so distant westward as six miles farther nearly to the westward of the upland. The second branch is the Petit Merme. This like the Maine heads in the north-west of the island, and runs, as the Maine, escapes through a small narrow valley through the upland. The lowland area that it enters is, however, very small, and for a short time or from its head there is no watered marsh known as at present.

The entrance to the narrow valley is the same.

In searching for a reason for this arrangement of the Maine

we, prolonged eastward they would both head in streams, the Saco and the Soule, flowing for some distance on the low-

ward and entering the Maine directly.

*The headwaters of the Saco and the Petit Merme.*—In explain-

ing these things it is to be remembered, were once actually a topographical feature at a time before the lowland was reached, and as well

that would be to the present.

most, are now in the recesses of the top of the strata, hence they may all be called consequent streams. They must all have

strata. The Maine is much the largest of these three streams, and its valley must have been formed rapidly, while the other valleys must have been deepened slowly. As the valleys were deepened, they progressively widened out but the widening must have been much more rapid on the weak strata on the present strata, and the deep valley of the Merme must have widened in the weaker strata much more rapidly than the neighboring shallow valleys of the Soule-Saco and the Saco-Maine. Now the question arises, will the divides between these three valleys of it in such a manner as to be the assumed original

\* And, to be more exact, the river Soule is a quite separate feature.



and arrangement? Undoubtedly they would, and for two or three centuries.

The valley of the Marne being deeper than that of the Seine-Somme, the divide between the two would be pushed on away from the upper and toward the smaller streams, and eventually the upper course of the Somme-Saint-Amand would be diverted by a reversing slide down it, of the Marne (the lower part of the Seine would be led to join that enormous river, while the lower course of the Somme-Saint-Amand-Saint-Amand would remain as a distinct



channel, isolated river. The same branch of the Marne which crosses the riverbeds, belongs to the class of streams unaltered

and the Seine-Saint-Amand. At first, as these streams are of a not equal volume, the divide between them would not be pushed slightly to one side or the other but after the capture of the

its valley on the weak stream, and from that time forward the

of the same would also be diverted to the Marne & the way

of the lower Sonale, leaving the lower waters (the Petit More) as an independent, headless stream; but there yet as there

is natural to expect, and the broken Petit More will, at the

bottom, run as by the current behind it (the Sonale).

The *effluent* of capture is called the *char*; thus the diverted lowwaters make where they join the diverting stream "the elbow of capture." After the capture the returning water can rise with, even a sharply entrenched valley above and below the

curve into the head of the diverting stream, where the velocity is zero, must immediately deepen and narrow. As the process

of such a sort can only be taken as a relation of recent experience

by some lateral branches, thus its flow may be delayed by swamps or it may be overlet back in shallow lakes, as

but this is also a relatively short and condition, for as the process the head of stream will adjust its force to the work

and disappear.

In every all cases further shortening is enforced upon the unbroken stream below the elbow of capture. It becomes as very slowly, while the transformed an aqueous discharge

away from the elbow of capture and the broken stream will be progressively diminished. The distance of the source of the unbroken stream from the elbow of capture may therefore be generally taken as a measure of the remoteness of the time when the capture took place. It not infrequently happens that a small stream is developed, flowing into the flow of capture from the neighborhood of the source of the unbroken stream, and pro-

vided stream is shortened. Let us call streams of this class flowing against the grain of the stream, *anagoras*. They will manifestly be wanting at elbows of capture, but they only attain

Now, look at the actual arrangement of the streams on the lower Sonale west of the delta and on the upper and beyond the conary mouth,

at the bearing these deducive criteria in mind. The Seine has lately been captured by the growth of a subsequent branch from near the elbow of the *Seine* or *Lebehol*, at the little village of

a narrow trench for a considerable distance above and below the elbow. The Petit Morin is evidently a *Lebehol* or arm of the *Seine* on account of its direction of valley as it is for the present, and is to keep its valley near of the *Seine* as it is

by near Honey and La Thonrille, above the great marsh of St.



land and its extensive or parts of part when the head of the stream. It is a *Lebehol* or arm of the *Seine* as it is still close to the elbow of capture at Ecury-le-Hepes, and no subsequent stream is yet developed in this case. Therefore is a *Lebehol* of recent date.

Look next at the *Seine* and *Meuse* system. Here the capture occurred long ago; there is no sign of a *Lebehol* or arm of capture. A subsequent stream, the *Meuse*, about four miles in

land, and the head of the *Meuse* stream is now in a *Lebehol*

place. Having lost its head rather early in the history of

On a report, its valley through the up-son is not cut to a great

which was becoming at a much later period, when it had become nearly as good as that of the Maine itself.

It was while studying the French texts at home that I first came across this most remarkable example of an grating complex and a testament of man's ingenuity to structure, but it was not until an excursion abroad in 1954 that I was able to study it in the ground. I then found the gratification of observing the bird's behavior.

lines formed from study at a distance. The example of the

case for systems of the kind.

It is curious to note that an other small stream, the *Ap. 1* stream, flows toward the margin of the flood, but instead of being diverted northward by the Snake to the Marine it is diverted southward by the Snake, a subsequent branch of the A line. It seems a reasonable conclusion, consequently, that it has diverted the Marine at Pours, and thus cut it off from the flood. Meru, whose outlet is, like that of the branch to the west, land west of the escarpment.

It is manifest that the terminal jet here would yield well as of

Even old river marks seem if they possess the same systematic features as are here so well exhibited. That such is the case I can confirm from the study of several examples near the mouth of the Swedish Lap or Wotien river where the headwaters of the Norra are again, up to a way the divide that separates them from the northern tributaries of the Angerlona. Although the arrangement of parts is not the same as in the example near Chik, as yet the homologies of the two rivers can be clearly made out. The same may be said of the river of the Enga, which are as a rule well adjusted to the eyes to twenty the upland of the red to find the black.

## ACROSS THE GULF BY RAIL TO KEY WEST

BY JEFFERSON B. BROWN,

*Collector of Customs of the Port of Key West*

The traveler approaching Key West from the Gulf of Mexico cannot but wonder that a ward of twenty thousand people on

isolated from the rest of the world. After having and seeing how little man has done for the improvement of the island, or rather how nature has been hampered by man's mistakes, the vis-

itor could have grown up without realizing a more vigorous connection with the state and country of which it politically forms a part. Unless, however, our visitor is an exceedingly superficial observer, he will soon begin to realize that it is not so much a matter of surprise that the city has attained its present growth as that, with the natural advantages it possesses, its development has not been at a greater. He will learn that for fifty years Key West has been the supremacy as the most populous city of the state, and that it owes its prosperity not to any single industry, but to the diversity of its sources of revenue, the outgrowth

of its diversified manufactures, its importance as a commercial and port of call for the commerce of the Gulf, its superiority as a naval rendezvous and military station, all have con-

tributed to the growth of its material prosperity. The fisherman, the sailor, the sponge diver, the fisherman, the wrecker, and the stevedore, the coconut taker and the merchant, the tobacco grower, the fruit grower, all find employment in Key West in all the

branches of industry, with the single important exception of rail-roading, never has toation-on has been so a week a year in the

It is not too much to say that after the completion of the X the South. Its harbor, landlocked by reefs and keys, is

which can float two largest ships of the United States Navy has four entrances. The south-west passage has 34 feet of water on the bar, the main ship channel 31 feet, the south-east 22 feet, and the north-west 14 feet. A vessel leaving the harbor of Key

before she could change her course for her port of destination, and through the main ship channel she would have only five miles to run before she was at sea. Ships putting in at Key West for stores or repairs need go out of their course but 10 miles, an advantage possessed by no other port in the United States. The Government is now engaged in deepening the narrowest passage to 21 feet, and when this is completed ships trading to

one of the main channels and passing on over the north-west bar, thus saving 70 miles and avoiding the dangerous reefs and the Tortugas shoals.

That Key West will within a short time be connected with the mainland by a railroad, no one who has noted the trend of railroad building in Florida can doubt. The ultimate object of all

at an extreme southern point, and Key West meets these requirements to the latest degree.

It is known that J. C. Bailey for the International Ocean Telegraph Company as long ago as 1866. General W. F. Butler, better known as "Fido" Smith, at that time president of the company, obtained from the Spanish Government an exclusive privilege for a cable on the coast of Cuba for forty years. The company had under consideration two plans for reaching Key West with its telegraphic system. One ran from and a line to Punta Lanza, Pinar, and thence by cable to Key West; the other ran from Havana among the keys. It was proposed to drive iron piles into the coral rock in the waters separating the keys, and to support them about 10 feet above high-water mark with wooden poles, and Mr. Bailey was empowered to make

a railroad to Key West, and to embody in his report to the company

with the popular notion of what such a road would cost. When the Western Union Telegraph Company obtained control of the

its possession, and it has been found that the

The distance from Key West to the point where a road would connect with the main land is about 1 1/2 miles, 1 1/4 of which would be on the keys. The construction of a railroad from Key West to Bahia Honda, an island 20 miles from Key

would be comparatively inexpensive. When cleared of a few inches of vegetable soil and loose stones, the surface of the island is level and so soft as a ballroom floor. From Key West to Bahia Honda the railroad would traverse Boca Chon.

Pine Key. Between these is some short stretches, ranging from one hundred yards to half a mile. The path, would be necessary,

the necessity of trusting and making a solid road bed. Not more than seven feet of water has to be crossed until Bahia Honda is reached. This channel is a water way

about 20 feet, the distance across it being a little over a quarter of a mile. Here it would be necessary to have a drawbridge, as the channel is used by the small vessels cruising along the coast.

The most laborious and expensive portion of the road would be

the distance from about eight miles, but dotted along the route are several small keys, surrounded by shallow reefs, which cut up a half-mile or more on all sides. Molasses Key lies directly on the route from Bahia Honda to Knights Key. Between Molasses Key and Knights Key the water is deep and bold, and if the road was cut straight across it would cross about half a mile of water varying from 20 feet to 25 feet in depth; but by making a slight detour to the northward and traveling from Molasses Key to Pigeon Key, and from Pigeon Key to Knights Key, very water would be avoided. Between

the former islands lies the Moser channel named after Lieutenant J. P. Moser U. S. N., who I learned is doing topographical survey work. It is only several years ago, and four miles apart and to the westward of Knights Key is the channel which bears its name, over one hundred of these channels there would be another main bridge.

After reaching Knights Key the road would be very interesting for a distance of 20 miles, to the small keys to the eastward of



Gloucey Key were reached. The ice there would be two and one-

key. After traversing Long Key for four miles the train would run over a little more and one or two miles longer—no water carry-

ing or other impediment. The next island is Upper Matecumbe, to reach which would require a bridge two miles long and a strong bridge over one of the three channels separating these two keys.

The last named island, the largest and most fertile of the entire chain, is 38 miles long, and is situated on the north side with the mainland.

By a fortunate provision of nature there is situated about 30 miles from Key West a large island known as Big Pine Key,

too. All the islands over which the road would run are of coral

islands of iron, which is one by driven into the soft coral rock. The pilings along the bottom of the reef are so constructed and stand-

have withstood the storms and cyclones of forty years. Over

the island of freshets. Outside of the main of road and running parallel with it lies the bottom reef, forming a sort of break-water from Key West to Key West, and protecting the road from the sea even in the severest hurricanes. The channels between the reef and the keys are not over 12 feet deep, and the water in which the floating would be in. It would be no more than that of any of our large rivers.

The keys are all below the frost line. The main

the two freezes of last winter were not affected in the slightest degree, and the main, perhaps, the only one, and the only one were not, perhaps, the only one, after the frost and vegetables in another part of the island had been destroyed. owing to lack of transportation from the main, however, only a few of the keys are under cultivation, and the growth of the more delicate vegetables.

which must find a ready market, is based on the local demand.

country with fresh vegetables all winter.

Key West is destined to become the Newport of the South. Not since the exceptional year 1896 has the temperature risen above 92° F., or fallen below 44°, so far, the mean annual maxi-

annual maximum has been 84.5°. In 1891 the minimum was 60°, in 1892 53°, and in 1893 52°. So it ranges from the ocean now continuously over the island. The extremes for 365 days

in time, except occasionally in the months of September and

are no natural cooling pools or streams, and summer or later the thousands of tourists who are restlessly seeking a milder and

in Key West their ideal health resort.

The products of the West Indies and Central America will be for distribution to all parts of the United States. A canal will

dock at Key West, and when work comes for repairs the trad-

out will carry way to Newport News, and with the completion of

rices and repairs for no small part of this shipping of the world.

A railroad to Key West will assuredly be built. While the fact that it has no exact counterpart among the great mercan-

enterprises, a subject for a line of inquiry by itself, is not a

able. It is, however, a magnificent enterprise and one the ex-  
ecution of which will call for the exercise of quantities of the very  
greatest energy. Will it be that year W. Field?

The hopes of the people of Key West are centered in Henry M. Flagler, whose financial genius and public spirit have opened up to the tourist a new beach-seeker attraction. If the beautiful coast of the state. The building of a railroad to Key West would be a fitting  
commemoration of Mr. Flagler's remarkable career, and his many

achievements of the last few years.

## SLANDIS

The April number of the *London Geographical Journal* contains an important account by Dr H. K. Miall of his plan for a

the proposer that a mapmaker shall be prepared for each sheet of the thirteenth—sixteenth maps, giving a map of places, the names of the sheet and of the areas included in that sheet.

geographical explanation; the areas of woodlands, mountains, and

of historical events; and, finally and chiefly, a geographical

the foregoing conditions, especially with regard to the sets of towns and villages, the distribution of population, the situation of natural resources and historical development of industries." A few carefully selected photographs of typical scenery shall accompany each map. Some small maps and diagrams may also be included. A bibliography would give the titles of all pertinent publications.

This plan was favorably received at a meeting devoted to its

Society and vigorously pressed upon him by an interesting H. there concerned. With the expectation of bringing out a series of the a fact on may well be turned to work to home and, for, as was truly remarked at the opening of a recent London Geographical Congress, however great the glory of a last expedition may be, the study of the new country is a geographical duty.

It may, however, be questioned whether the method of issuing a monograph for each survey sheet is in the whole a feasible work in which the physical and political geographical chapters, the most important parts of a map, ought to be limited by natural and not by arbitrary geometrical boundaries. Unity of treatment would be gained and much repetition would be avoided by

the sheets. The usefulness of the empirical measurement of distances on so detailed a scale as here proposed may also be questioned. Not contour line areas, but physical geographical areas, should be considered, for it is of the geographical value to measure an area by a certain kind of area, e.g. two surfaces of equal limiting altitudes, one a steep slope, the other a broad flat. Again, the non-sensicality of the comparison is hardly recognized in the statement that "the [physical] geographical, or, what we would, as far as the geology is concerned, be simply a restatement of the 'physiognomy' section of the [new] geological survey memoir, with such modifications as the modern views of the cycle of development of a land surface suggest." It is as if one were to say that a petrographical chapter in a new geological report should be merely a modification of a chapter on rocks that was written before the methods of modern petrography were introduced.

It is stated that the geographical description "must be the work of a trained geographer, who, after studying the maps in the light of all the information received to date, shall have made himself familiar with the area." There are, in Great Britain, many travellers and explorers, but not many "trained geographers" in the sense contemplated by Dr M. J., and here

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title or text. But the difficulty may be in great part solved if to the wrong chapter we apply what Dr M. J. says of a certain "conforming section": "It would be very suitable as an exercise for a training for a student if any material on existed in the country where students could be induced to study geographically seriously." A work of this sort must necessarily be uneven in quality. It should attract a marked approval. It is in a fair way to get a much better ending and when the chief or a reviewer of the other parts may be fairly demanded. It is, therefore to be hoped that Dr M. J. will not adhere too closely to the philosophy that prohibits going to the water tap, after getting the water, but a beginning of the work at least, we may as a man is at the beginning to new geographical area, and not merely as a vacationist or foreigner, as already mentioned. Let the local geographical societies arrange that it will publish in a volume of chapters written according to an approved plan and reviewed by a standard satisfactory to a committee of editors. An actual beginning of this nature, at the best from at present attainable, will give the strongest possible impetus to the various study of geog-

many in the catalogues and in versions of a country where its extent is now so laboriously explored.

To all parts of the work might be applied the remark introduced by the author:

"very strongly insisted on as to confine it strictly to those features and events of direct geographical importance." The

caution is that this stringent method will surely be needed in every chapter of the proposed memoirs. Care must be taken

not to include that which has not a "direct geographical importance." I have

become purer and saggier. More birds of species have practically no geographical bearing. If treated with relation to distribution

it is useful to reinforce the appreciation of conditions of form, a latitude, etc., and to make them become as fully geographical as any other means of enlightened description. So with the study of population. Numerical notes extracted from census reports make the essential variety of relationships that characterizes geography clearer. True geographical study is never to bring out the meaning of numbers and their application

that a herd which will probably cooperate with him are not so fully impressed by form and that a committee of editors as a whole might not see the importance of extending more labor

from the beginning.

There is no place in the world that is today so favorably situated as this. We are defined by better position, a compact environment

have established. There is, on the whole, no society in the world that is so well situated for the study of geography.

Indeed in the whole center of commerce, the resort of great numbers of explorers, travelers, and others of geographical avoca-

patience, possessing vast resources in his library and the faculty. Dr. Miller, as a secretary of this society, is to be congratulated on the surroundings and in which his project takes form, and we wish him the greatest success in its execution.

V. M. Davis

## THE MEXICAN CENSUS

The population of Mexico, as ascertained by the census of October 20, 1895, is 12,876, 760. The population of the different States, with their respective capitals, is as follows:

STATES		CAPITAL CITIES	
Aguascalientes	187,045	Aguascalientes	
Campeche	101,458	Campeche	
Coahuila	255,618	Saltillo	
Colima	55,057	Colima	
Chihuahua	312,078		
Durango	284,344		
	2,212,258		
	41,351		
	542,000		
	1,117,800		
	836,100		
	201,700		
	150,400		
	300,000		
	88,520		
	70,700		
	997,130		
	375,814		
	2,014,400		
	70,250		
	152,700		
	24,200		
	60,600		
	815,070		
	287,500		
Zacatecas	452,100	Zacatecas	
Federal District	484,000		
Territory of Texas	141,000		
N. Ind. Lower Cal.	7,400		
S. Ind. Lower Cal.	24,800		

## GEOGRAPHIC LITERATURE

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**7. 结论**

**THE UNIVERSITY OF CHICAGO PRESS**

1

[The work is a perfect combination of artistic beauty and function, from the use of durable materials and sturdy design to its practicality. As the artist himself states, "It is a beautiful thing to see people of another language understand what you are trying to say."

[illegible]

vide Case No. 1 of Alameda County against United States and  
Federal Survey, Washington, 1904.

born George Blaine Foster, February 1891, Kentucky. Moved to Georgia at age 10. Education: Georgia Institute of Technology, and a year at the University of Chicago. Newspaper career: joined McClure & Co. 1914. "US needs

The authors of the book, Dr. James H. Dyer, Jr., and Dr. William L. Dyer, Jr., are both members of the American Society of Plant Pathologists.

The following countries and Agencies of the United States for the year ending June 30, 1965, are listed by the Office of the Director of Statistics, Treasury Department:  $W_1$  = Western Union;  $W_2$  =  $W_1 + 1$ ;  $W_3 = W_2$ , with changes.

Source: not a derivative of the United States. 1990. Fig. 4 (not to scale).

of the form  $\|x\|_2^2 = 1$  may contain, for

A common rule of thumb is usually available for the ecological success of a species. The probability of a biogeographic event depends on the number of dispersal attempts a species makes. The more attempts, the higher the probability of success. The more attempts, the higher the probability of success. The more attempts, the higher the probability of success.



coming from the fact of 300,000,000. Before the war started we were to win the country in ten equal measure intended for its action. The order of this great nation was for

The new edition of the Hornsby-McNair state pocket atlas is just what it has to add to the well deserved popularity they have so long enjoyed. The maps are clearer and hand-somer than ever and the geographical and statistical facts are arranged and compiled in a way to be of real help to the population now living in the state, some of 1915 being added later for that at the first issue of 1910 is of value to who go into more recent ones. A new book.

No. 1. The same has more or less been in the way that is No. 2. with a provision in the paper, not recently put in out by the Trustees of Howard & Slater Fund, of the funds brought to light by the Elusive in Canada is the existing the occupations of the negroes. The trustees in a list of fund can be made. The brief copies of a 4-200 pages including for a more satisfactory with the form of the list in my important facts and could not be. viz. 1) at the same time as many as possible to be in a representative or person of the other. and the law in a particular regard with the progress of civilization.

[illegible]

A) the present exception of the Yearbook of the League of Nations, of which the 1930-31 volume provides abundantly there is no indication of the United States Government that is evidenced by the frequent failure to publish statistical papers that are the Annual Report on the United States and have been published in the form of Statistical Abstract of the Treasury Department and that the statistical abstracts issued annually from 1925 on to now. These publications contain a statistical abstract of other countries, the use of which together with of the currency and for a large number of important economic data, together of total and per capita, is necessary for an understanding of market prices. They also contain the value being recorded and quoted by the United States of every article of value on the market of every country, and however small, among the most extensive and useful data in the world. The figures themselves also are very compact and easily understood. It is therefore to be regretted that the publication of the yearbook for 1931 is not more or less improved by a revision of course to include the figures for the year

[illegible]

and pages have in no wise detracted from the value of the work. The author has responded to the

request of the Society to revise the work, and has made such changes as to make it more complete and accurate. The work is now published in a new form, and is a valuable addition to the literature of the subject. The author has also added a new chapter on the history of the subject, and has revised the other chapters to bring them up to date. The work is now published in a new form, and is a valuable addition to the literature of the subject. The author has also added a new chapter on the history of the subject, and has revised the other chapters to bring them up to date.

even our most careful work of reference are not free from errors, but

the errors are few and far between, and are of a minor nature. The work is now published in a new form, and is a valuable addition to the literature of the subject. The author has also added a new chapter on the history of the subject, and has revised the other chapters to bring them up to date.

graphical errors.

J. H. H.

## SOCIETY, SESSION 1895-'96

*Special Meeting, March 27, 1896.*—Vice-President Ogden in the chair. Dr. James A. Eckels, Comptroller of the Currency, addressed the Society on the Geographic History of Currency.

*Special Meeting, March 30, 1896.*—Fifth Monday afternoon lecture. Mr. W. J. McGee in the chair. Prof. Harry Fox King read a paper and illustrated the history of American navigation by many original views by two of his last men.

*Regular Meeting, April 4, 1896.*—Vice-President Gannett in the chair. Mr. J. W. T. Hall read a paper on the Great City Case.

*Special Meeting, April 6, 1896.*—Sixth Monday afternoon lecture. President Hildner in the chair. The President announced that Prof. Wm. H.

pages. Mr. Baker then described the voyage from Alaska westward to Asia, and with lantern slides attracted attention.

*Special Meeting, April 10, 1896.*—President Hildner in the chair. Mr. Wm. F. Mannix addressed the Society on the Subject of a War Correspondent, with his own editorial illustrations.

President Hildner in the chair. Prof. J. C. Russell described his re-

but the interior of Alaska, up the Yukon and Porcupine rivers, and across the Canadian coast to Lynden, and, during his address by means of a large map and a cinematograph show. The President announced that this was the last of the special information sessions, and that the next part of the program, consisting of 1926, would probably be an illustrated tour across the Atlantic and through the Mediterranean.

*September Meeting, Lord 17, 1881.*—Present, 11, including one of the London Field Club, Fred T. Denton, F. S. S., read a paper, & assisted by his own & other, the Linnæan Club, Society, and Linnæan Club of London.

The following is recommended to you by our experts in writing to inform you of action of the national board of:

if large  $\gamma$ . And, as  $V_n$  increases, the other edges in  $\mathcal{E}$  or vertices may be included, in the direction of the flow of

The sum of the weights shall consist of a polynomial function of  $n$  such that  $w_n$  is the weight of the  $n$ th term in the design, here  $w_n = 1/n$ .

*Special Meeting, April 24, 1890* — Held at 107 W. Third Street, Cincinnati  
of the Society, he received the position as largest from the chair taking for  
his subject the Progress of Africa since 1860, with special reference to  
South Africa and Abyssinia. The address was accompanied by lantern-  
slides (see no. 10).

*Special Hearing, Vol. 4, 2006* — President Bushard in the chair. Mr. George L. Kopp read a paper, with his terminology of operations as simple as is dictated by Previous Hearing.

In your Meeting, Nov 13, 1925. — J. with Annual Meeting of the Society  
the annual reports. Pending assignments to the officers were con-  
sidered and adopted as follows:

of minerals listed      May 7

\* Article IX. Seal. The seal of the Society shall consist of a profile view of the wooden hatchstone from G<sup>1</sup> 14 1822 used for the purpose, with the legend: "Native American Geographical Society and its aims."

Mr. W. A. [in Country] Co. J. C. Rizer were appointed a committee to audit the Society's accounts.

The Term was announced last, in accordance with the resolution adopted by the Society at a meeting held December 27, 1895. The Board of Managers had divided its members in three groups of six members each, as follows: To retire in May, 1899, Mr C. J. Lord, Mr A. C. W. Paine, Jr., Mr G. K. Gilbert, Mr H. C. Ogden, Mr J. R. Proctor and Miss E. R. Sedgwick. In May, 1902, Mr Martin Baker, Mr H. P. Loomis, Capt. R. Hadden, Dr C. A. M. Brown, Prof. W. B. Fernald and Mr J. B.



## GEOGRAPHIC NOTES

### NORTH AMERICA

**AMSTERDAM.**—The *New York Herald* and *Times* have agreed on a limit rate of 100,000 marks, regarding the tonnage of the value of 500,000.

**MEXICO.**—The imports of articles of value into Mexico in 1903 were nearly double those of the preceding year, although the Mexican duties were lowered by protection and also by the new process of value.

**PANAMA.**—The Board Society of Panama has decided a memorial to the governor-general praying for intervention with the Imperial government in favor of the modification of nautical, civil, and astronomical time, the reform to come into effect on the first day of the new century.

The Canadian and United States governments have come to an agreement in the establishment of a fast steamship service between Vancouver, or some other British port, and Quebec in summer, and Portland, Nova Scotia, in winter. The vessels are to be in every respect equal to the best steamers plying in New York.

### SOUTH AMERICA

**BRAZIL (PARANA).**—About 20 miles have been completed of the main line that is being constructed from Curitiba south, at the junction of the Macario and Cuiabá rivers and up some the winding lower of Curitiba to the interior of the country. Another enterprise that will soon be given to the interior is the line that is being built from Wlenger, on the Demarado river, as a point on the Esquid, to cross the numerous lakes that interfere with the navigation of that stream. Two other lines, both in the Paraná mining district, are being rapidly pushed to completion.

### EUROPE

**AUSTRIA.**—Large vessels can now sail right up the Danube to Vienna, and the construction of ship canals connecting the Danube, Rhine and Elbe to, and also between the important cities, is strongly advocated.

**ENGLAND.**—The total revenue of the Manchester ship canal for the first six months of the present year shows an increase of more than 500,000 marks over the corresponding period of 1902.

The president of the Royal Geographical Society, Mr C. R. Markham, received the honor of knighthood on the recent anniversary of Queen Victoria's birthday.

The Founder's medal of the Royal Geographical Society has been awarded to Sir W. Murgess for his valuable geographical work in New Guinea, and Patron's medal to Mr St. George R. Lushington for his explorations in Central Asia, the Merion award to James Harrison Hunt of Shipton, native Indian surveyor, the Bull memorial to Mr A. P. Low for explorations in Labrador, the Blackman to Mr J. Burr Tyndal F.R.S.

most parts of the barren bounds of northern Canada, and the only Central Africa.

1892. According to the latest census, the population of Paris is now 2,501,250, an increase of 87,500 in five years.

The proposed canal between the Sea of Norway and the Mediterranean is projected by the French as a private enterprise, and the committee further report that, others on such strategy for other advantages would justify the construction by the government.

The activity and influence of the Société de Géographie de Paris are indicated by the fifteen medals and prizes just awarded as follows: 1. Grand Gold Medal, Prince Louis d'Arenberg, Exploration from point of unknown to point of Bengal, 2. Gold Medal, Captain G. Tesson, Explorations through Dahomey and to the Niger, 3. Legend Medal, Commander Decroix, The Niger Mission, 4. Fournier Medal, L. Monod, The New Geography of Universal Geography, 5. Mallet-Bachelier Medal, P. Chenebise, Ethnographical and zoological investigations in central America, 6. Debes Medal, P. J. Chaud, Explorations in the north of Cyper Sahel, 7. Herbert Fournier Medal, A. Payer, Explorations in Lapland and efforts to extend the power of France to the far East, 8. Bourgeois Medal, L. Lacroix, Voyage in the Pyrenees and study of the Neogene, 9. Bourgeois Medal, Commaux for Debus, Investigations of French Congo and surveys north of Africa, 10. Morel Medal, J. Besson and C. Lebel de Lisle, Surveys in the French Congo and Gabon, Tonkin, 11. Mallet-Bachelier Medal, R. de Saint Arnaud, Study of geographical enterprises of the 19th century, 12. Legend Medal, P. A. Fournier, Work on lake Leman and on glaciers, 13. Janssen Medal, E. Fournier, Physical observations and explorations in the Sahara, 14. Janssen pour H. Brachmann, Memoirs of travel in French Sahara.

1893. The final result of the census of the German Empire taken in 1890, shows a total population of 59,944,500, an increase of nearly 1,000,000 in five years.

The trade returns of the North Sea and Baltic ports have so far

1894. 800 marks per annum had been counted off, whereas the first eight months the newly constructed Hamburg and Berlin marks had represented a trade of only 516,480 marks.

1895. The population of Rome on December 31, 1890, is officially reported as 471,861, an increase of 12,001 since December 31, 1885. For some years a bad season of depopulation was made of one of the principal parts of the city were at least 100,000 persons were being removed to the suburbs at the census of 1881, viz. 28,000. The number having died a year was 43,401 and the gain was 55.

#### ASIA

1896. The French geographers at Chongking are taking a road to Lanchow and are constructing a telegraph line.

**COAST LINE.** A few operations looking to the development of the northern coast of Upper Burma are about to be commenced. A pearl fishing ground has been discovered in the Wartha delta, at a point 150 miles from the coast.

**RAILWAYS.** An imperial contract awards the construction of a railway from Singapore to Siam, 65 miles, at an estimated cost of 2,000,000 taels.

**FINANCE.** The government has sanctioned a large increase in the tobacco duties.

**TRANSIT.** The Russian government is said to have decided to take another step toward getting within striking distance of Laos. A branch railway is to be built from Mien to a point near the Afghan frontier, a distance of about 150 miles, and all necessary material is to be collected at the far end of the line for the rapid extension of the road to Lhasa, a further distance of only 140 miles in the event of war. Authority is given to the Chinese to build a short distance of the Afghan frontier

**COAST GUARD.** An amicable settlement of the border disputes between Siam and Laos.

**COAST GUARD.** In the British Colony of Natal there are more than 5,000 Indians, a large number of whom are clamoring for some relief from the further immigration.

**PROFESSOR ELLIOTT'S EXPEDITION.** General Macleod reports that Prof. G. Elliot and Messrs. Akeley and Dawson arrived at Akaha, on 14, where they remained 70 days, 50 canoes and 20 men and horses. A week after they returned to their camp on the northern coast. An absence of 100 days, and a journey of 1,000 miles. The main object of the journey is the collection of mammals, but no effort was spared to make it a zoological excursion varied and complete.

**Dr. Elliott's Expedition.** Interest is now in Elliott's journey, by the very successful expedition of Dr. A. Davidson Smith, of Philadelphia, who left America early in 1884, and visited the unexplored country of China and, between Shensi, river and lake Kow-fu. This lake, to the northwest of Victoria Nyanza, was reached in July, 1884. After a journey of 4,000 miles, he then arrived at Lhasa, on the east coast north of the lake, on the river 25, having traveled only six times the distance.

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